Massachusetts Department of Environmental Protection
Source Water Assessment and Protection (SWAP) Report
For
Chester Elementary School

What is SWAP?

The Source Water Assessment and Protection (SWAP) program, established under the federal Safe Drinking Water Act, requires every state to:

? Inventory land uses within the recharge areas of all public water supply sources;

? Assess the susceptibility of drinking water sources to contamination from these land uses; and

? Publicize the results to provide support for improved protection.

SWAP and Water Quality

Susceptibility of a drinking water source does *not* imply poor water quality. Actual water quality is best reflected by the results of regular water tests.

Water suppliers protect drinking water by monitoring for more than 100 chemicals, treating water supplies, and using source protection measures to ensure that safe water is delivered to the tap.

Prepared by the Massachusetts Department of Environmental Protection, Bureau of Resource Protection, Drinking Water Program

Date Prepared:
January 30, 2003

Table 1: Public Water System (PWS) Information

PWS Name	Chester Elementary School
PWS Address	Middlefield Road
City/Town	Chester, Massachusetts
PWS ID Number	1059012
Local Contact	Dr. David Hopson/Ms. Norene St. Martin
Phone Number	(413) 685-1000

Well Name	***Source ID#***	***Zone I (in feet)***	***IWPA***	***Source Susceptibility***
Well #1	1059012-01G	133	437	Moderate

Introduction

We are all concerned about the quality of the water we drink. Drinking water sources may be threatened by many potential sources of contamination, including septic systems, road deicing, and improper disposal of hazardous materials. Citizens and local officials can work together to better protect these drinking water sources.

Purpose of this report:
This report is a planning tool to support local and state efforts to improve water supply protection. By identifying land uses within water supply protection areas that may be potential sources of contamination, the assessment helps focus protection efforts on appropriate best management practices (BMPs) and drinking water source protection measures. Department of Environmental Protection (DEP) staff are available to provide information about funding and other resources that may be available to your community.

This report includes:
1. Description of the Water System
2. Discussion of Land Uses in the Protection Areas
3. Protection Recommendations
4. Attachments, including a Map of the Protection Areas

1. Description of the Water System

Chester Elementary School is a small, rural school with a total student and staff population of approximately 110 people per day, located on Middlefield Road in the town of Chester, Massachusetts. The school, which was completed in 2003, serves the Towns of Chester and Middlefield, which are rural residential and recreational communities situated in the Berkshire foothills in western Massachusetts. The Town of Chester does have a municipal water system but it does not serve this area of Town. The Town does not have a municipal wastewater system. Therefore, the school operates

What is a Protection Area?

A well's water supply protection area is the land around the well where protection activities should be focused. Each well has a Zone I protective radius and an Interim Wellhead Protection Area (IWPA).

- **The Zone I** is the area that should be owned or controlled by the water supplier and limited to water supply activities.
- **The Zone II** The primary recharge area defined by a hydrogeologic study.

In many instances the IWPA does not include the entire land area that could contribute water to the well. Therefore, the well may be susceptible to contamination from activities outside of the IWPA that are not identified in this report.

What is Susceptibility?

Susceptibility is a measure of a well's potential to become contaminated due to land uses and activities within the Zone I and Interim Wellhead Protection Area (IWPA).

a single public water supply well and disposes of wastewater through an on-site septic system. The school well is a 6-inch diameter, 350-feet deep bedrock well that is located immediately adjacent to the school soccer field. Bedrock was encountered at 39 feet below grade but the casing was extended to 60 feet below grade into sound bedrock. The well casing extends above grade and has a secure well cap.

The Zone I is the protective area immediately surrounding the source and is assumed to contribute recharge to the source. The Zone I for individual wells is a circle centered on the well with a radius ranging from 100 to 400 feet based on the approved withdrawal rate from the well. An Interim Wellhead Protection Area (IWPA) is a primary recharge area designated for a groundwater source when the Zone II has not yet been delineated. The actual recharge area for a well may be significantly larger or smaller than the IWPA. The Zone I and IWPA protective radii for Well #1 are 133 feet and 437 feet respectively based on the approved withdrawal rate of 1,656 gallons per day for the well. The well was tested and approved through the New Source Approval process and although the soccer field is in the western half of the Zone I, the DEP has approved that use provided pesticides and fertilizers are not used on the field. Therefore the well is considered to be conforming with Zone I requirements.

The IWPA of the well includes a 500-gallon propane underground storage tank (UST), a 6,000 gallon No. 2 fuel oil UST, a diesel powered backup generator, the boiler room, the tank room, some components of the septic system, part of the school, the CSX railroad track and Middlefield Road. In addition, the remainder of the school, the closed and capped Chester wood waste landfill, and the septic system leachfield are located north of (approximately 300 feet and 500 feet, respectively) but outside of the IWPA. The DEP Division of Solid Waste regulates the landfill. Prior to construction of the school and well, an extensive environmental assessment of the landfill was conducted, a risk assessment completed and the landfill was consolidated, closed and capped. There were preliminary monitoring requirements during the school development and there are long-term monitoring requirements of soil gas and groundwater quality for sampling points located between the landfill and the school. For further information regarding the Town's regulatory compliance with respect to the landfill, contact the DEP Bureau of Waste Prevention, Solid Waste Division in Springfield. For further information regarding the permitting of the school well, contact the Drinking Water program.

Geologic mapping indicates the school is located in the Berkshire foothills on the east limb of the Berkshire anticlinorium. The uplands are covered with thin till overburden

Table 2: Table of Activities within the Water Supply Protection Areas

Potential Contaminant Sources	Zone I	IWPA	Threat	Comments
Conforming Zone I	-	-	-	Contact DEP prior to conducting any work in Zone I or expanding the system.
Septic system components	No	Yes	Moderate	Maintain septic system. The school leachfield is outside of protection areas.
Transportation corridors, railroad track, school parking and stormwater structures	No	Yes	Moderate	Control the use of deicers and coordinate with emergency response personnel and the railroad company. Monitor for leaks and spills near the well.
School	No	Yes	Moderate	Use BMPs for school facilities.
Underground storage tank (fuel oil/propane); diesel generator	No	Yes	High/ Low	Use BMPs and monitor for leaks and spills especially during deliveries.
Athletic fields	Yes	Yes	Low	Continue to prohibit the use of fertilizers and pesticides in Zone I.

*** -For more information on Contaminants of Concern associated with individual facility types and land uses please see the SWAP Draft Land Use / Associated Contaminants Matrix on DEP's website - www.state.ma.us/dep/brp/dws/.**

Glossary

Aquifer: An underground water-bearing layer of permeable material that will yield water in a usable quantity to a well.

Hydrogeologic Barrier: An underground layer of impermeable material that resists penetration by water.

Recharge Area: The surface area that contributes water to a well.

Additional Documents:

To help with source protection efforts, more information is available by request or online at www.state.ma.us/dep/brp/dws, including:

1. Water Supply Protection Guidance Materials such as model regulations, Best Management Practice information, and general protection information.
2. MA DEP SWAP Strategy
3. Land Use Pollution Potential Matrix
4. Draft Land/Associated Contaminants Matrix

covering the bedrock. The school is located on the west side of the narrow river valley between the railroad track and the West Branch of the Westfield River. The valley fill is sand and gravel deposited by the receding glaciers 14,000 to 18,000 years ago and was likely reworked by recent streams and rivers with additional recent alluvium deposited. The bedrock at the school site is mapped as light grey to green quartz-plagioclase-granulite or schist of the Moretown Formation. There is no evidence of a continuous confining, clay layer or a thick till layer in the immediate vicinity of the well. Wells located in these conditions are considered to be located in aquifers with a high vulnerability to contamination due to the absence of hydrogeologic barriers that can prevent contaminant migration from activities on the ground surface. Please refer to the attached map of the Zone I and IWPA.

The water from the well is treated through an ion exchange water softener prior to distribution. The DEP requires public water suppliers to regularly monitor the quality of the water. For current information on monitoring results and treatment, please refer questions to the Public Water System contact person listed above in Table 1 for the most recent information. Drinking water monitoring reporting data is also available at http://www.epa.gov/enviro/html/sdwis/sdwis_query.html, the EPA's website for Envirofacts.

2. Discussion of Land Uses in the Protection Areas

There are some land uses and activities within the drinking water supply protection areas that are potential sources of contamination. Although most of the agricultural activities are outside of the Zone I and IWPA, because the IWPA is not a scientifically determine recharge area, the DEP often identifies activities that are near the source.

Key issues include:

1. **Zone I;**
2. **School and Athletic fields;**
3. **Underground storage tank; and**
4. **Transportation corridor/parking.**

The overall ranking of susceptibility to contamination for the system is high, based on the presence of at least one high threat land use or activity in the protection areas of the well, as seen in Table 2. The fuel oil UST located within the IWPA is ranked as a high threat; the tank is a new tank that is constructed in compliance with current UST regulations.

1. Zone I – Well #1 has a conforming Zone I with respect to ownership and activities within the Zone I. There is a soccer field within the Zone I of Well #1, however, the DEP may allow passive recreational activities and non-threatening activities within the Zone I. The school does not use pesticides or fertilizers within the Zone I.

Recommendations:

- ✓ Continue using BMPs to protect the water supplies.
- ✓ Do not allow any non-conforming activities within Zone I. Inspect the well cap regularly to ensure security and that there is no standing water around the casing.
- ✓ Do not use pesticides and fertilizers in the Zone I.

2. School and athletic fields – The athletic field is within the Zone I and some of the school facilities are within the IWPA of the well. However, although the grease trap and some components of the wastewater system are within the IWPA, the leachfield for the septic system is approximately 500 feet away from the IWPA for the well. Elementary schools generally use only household hazardous materials and the recommendations for small schools are similar to those for residents. In addition, there are state and federal controls on some activities and products used at schools to promote "healthy schools".

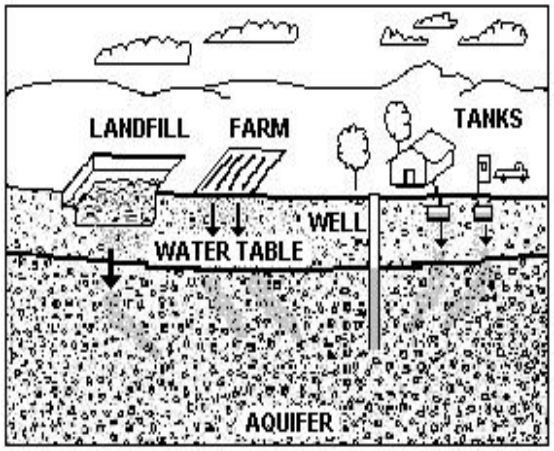

Figure 1: Example of how a well could become contaminated by different land uses and activities.

For More Information:

Contact Catherine Skiba in DEP's Springfield Office at (413) 755-2119 for more information and for assistance in improving current protection measures.

More information relating to drinking water and source protection is available on the Drinking Water Program web site at: www.state.ma.us/dep/brp/dws/

Copies of this assessment have been made available to the public water supplier and town boards.

Potential exists for contamination of the well by on-site use of cleaning materials, petroleum from lawn equipment, fertilizers, and pesticides. If managed improperly, activities associated with residences and the school can contribute to drinking water contamination. The school presently does not use pesticides or fertilizers on the field. Common potential sources of contamination include:

- **Household Hazardous Materials** - Hazardous materials may include automotive wastes, paints, solvents, pesticides, fertilizers, petroleum products for home equipment and lawn maintenance equipment and other substances. Improper use, storage, and disposal of chemical products used in homes are potential sources of contamination.
- **Septic Systems** – Improper disposal of household hazardous chemicals to septic systems is a potential source of contamination to the groundwater because septic systems lead to the ground. If septic systems fail are not properly maintained, they could be a potential source of microbial contamination.
- **Heating Oil Storage** - If managed improperly, Underground and Aboveground Storage Tanks (USTs and ASTs) and their associated fuel lines can be potential sources of contamination due to leaks or spills of the fuel oil they store.
- **Stormwater** – Catch basins transport stormwater from roadways and adjacent properties to the ground and streams. As flowing stormwater travels, it picks up debris and contaminants from streets and lawns. Common potential contaminants include lawn chemicals, pet waste, and contaminants from automotive leaks, maintenance, washing, or accidents. Visit the Nonpoint Source Pollution web site for additional information at the following MADEP website http://www.state.ma.us/dep/brp/wm/nonpoint.htm.

School and Residential Use Recommendations:

- The tank room is used for storage of supplies and some equipment. There is a floor drain in the tank room, which according to the school, is connected to the parking lot stormwater discharge system that discharges to a detention basin south of the soccer field. During the assessment, it was noted that cleaning equipment and cleaning materials were stored in the tank room. The cleaning materials are no longer stored in the tank room and will be stored in the janitor's closet where there is a low level, janitor's sink but there is not a floor drain in the room.
- Continue the use and maintenance of BMPs for activities within close proximity to the well.
- If annual floor cleaning requires the use of hazardous materials, dispose of the residual as appropriate.
- Continue to prohibit the use of pesticides or fertilizers within the Zone I of the well. Consider the use of Integrated Pest Management to minimize the use of pesticides and nutrients in fertilizers. Continue the use of Best Management Practices for all activities at the school and at the athletic fields. Consider drought resistant grasses and/or low release nutrient fertilizers in the IWPA, as required.
- Continue to use secondary containment for any petroleum products kept for maintenance and lawn care equipment. Presently, the maintenance equipment is kept in a storage trailer on the south side of the school.
- Review your emergency response plan regarding accidental releases within the area. Ensure that emergency responders in town are aware of the locations of your resource areas.
- Refer to the Massachusetts Public Health Association's Healthy Schools website for additional information at: http://www.mphaweb.org/pol_schools.html

3. Underground fuel oil storage – There is one fuel oil UST, one propane UST and a diesel fueled generator located within the IWPA. The propane UST poses minimal threat to the water supply, the UST fuel oil tank is a double walled tank with monitoring and the diesel generator AST is also double walled to protect against leaks. If managed improperly, fuel oil tanks can be a potential source of contamination due to leaks or spills of the materials they store.

Recommendation:

- Any modifications to the tanks must be accomplished in a manner consistent with Massachusetts's plumbing, building, and fire code requirements. Consult with the local fire department for any additional local code requirements regarding ASTs and USTs.
- Monitor all activities associated with the fuel oil especially delivery.
- Have spill containment/absorbent materials available on-site.

4. Transportation corridor and parking – The CSX railroad, Middlefield Road and parking areas for the school are within the IWPA of the well. The storm drains for the parking areas are directed to detention basins south (downgradient) of the well location but within the IWPA. Accidents and normal use and maintenance of roads, parking lots and railroads may pose a potential threat to water quality. Catch basins transport stormwater from roadways and adjacent properties to the ground, streams, rivers or reservoir. As flowing stormwater travels, it picks up de-icing materials, petroleum chemicals and other debris on roads and contaminants from streets and lawns. Common potential contaminants in stormwater originate from automotive leaks, automobile maintenance and car washing, accidental spills as well as waste from wildlife and pets.

Recommendations:

- Prepare an Emergency Response Plan that includes coordination between the emergency responders to be sure they are aware of the location of your well.
- Notify the Town Highway Department of your well. Review the stormwater management near the well with the Highway Department and work to ensure runoff is directed away from the well.
- Contact the Town Board of Health or Selectmen regarding the review of the railroad company's Yearly Operating Plan (YOP) for right-of-way maintenance. Be sure they are aware of the protection areas for your new well.

3. Protection Recommendations

Implementing protection measures and best management practices (BMPs) will reduce the source's susceptibility to contamination. The Chester Elementary School is commended for design criteria that direct stormwater downgradient of the well and for removing floor drains from the boiler room design. The Department recommends that you request your boiler maintenance contractor have absorbent materials on hand in the event of an accidental spill and that any boiler blow down generated during maintenance must be disposed of off-site by the contractor.

Funding:

The Department's Wellhead Protection Grant Program provides funds to assist public water suppliers in addressing wellhead protection through local projects. Protection recommendations discussed in this document may be eligible for funding under the "Wellhead Protection Grant Program". If funding is available, each program year the Department posts a new Request for Response for the Grant program (RFR). Other funding opportunities are described in "Grant and Loan Programs: Opportunities for Watershed Protection, Planning and Implementation" at the following DEP website: http://www.state.ma.us/dep/brp/mf/files/glprgm.pdf.

These recommendations are only part of your ongoing local drinking water source protection. Citizens and community officials should use this SWAP report to encourage discussion of local drinking water protection measures.

4. Attachments

- Map of the Public Water Supply (PWS) Protection Areas
- Source protection fact sheets